

Utility Application

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APPLICATION FOR U.S. LETTERS PATENT

Title:

JOINT CONNECTION

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JOINT CONNECTION

BACKGROUND OF THE INVENTION

[0001] The present invention generally relates to a system and method of fastening one or more pieces of material together in a wide range of applications. It is desirable to couple materials together in a manner that is both stable and secure. More specifically, the present invention allows for pieces to be securely coupled together without necessarily requiring welding or fasteners, for example, in the construction of structures. Although, optionally, welding and/or fasteners may also be used and/or required. The resulting structure is a stabilized, sturdy and load bearing joint connection that is, for example, easy to assemble and cost-effective.

[0002] In the past, ways of fastening materials together have included welding and non-welding techniques. Non-welding fastening techniques have, for example, used all types of pins, screws, flanges, fittings and bolts as fasteners to hold materials together. While these fasteners and devices may hold materials together securely, they generally add expense to the joint. Many industries, including the automotive industry, are pushing to reduce the number of needed parts. Also, fasteners can rust, become loosened, break under a heavy weight burden, and be stripped so as to no longer be amenable to tightening or loosening. Further, in many arrangements, it is not easy or effective to use fasteners due, for example, to constraints in size and materials. For example, fasteners are infeasible on many very small applications, such as those in the field of nanotechnology and biological structures.

[0003] Welding is also used as a means of coupling some types of materials together. Welding, however, has many disadvantages. Welding requires a skilled technician to perform the fastening technique, because it is dangerous, requires special tools, safety equipment, and knowledge of how to carefully position materials to result in the desired final structure. Furthermore, welding presents a wild fire hazard, due to flying sparks; welding forms permanent attachments that are generally irreversible; welds may fracture, rust, or otherwise be unsuitable for bearing heavy loads; welding is not feasible for use with many types of materials, such as plastics and many composites that might be desirable building materials; welding compromises the integrity of plating or coating in or near the weld joint – e.g., at the present time, even properly done welds can cause a brittleness in the heat affected area that may not be

picked up by inspections of strength, such as X-rays; and, for example, welding may not be a feasible means of fastening materials on the nanotechnology scale as of today.

[0004] Another commonly used way of fastening materials together is using a fastener such as an elbow or joint coupling piece, to couple together various materials. However, this type of fastening often requires, for example, skilled assembly and custom made fasteners. Also, fastening materials together using an elbow or separate joint piece is sometimes used for applications that are merely ornamental, and the resulting joints may have limited structural strength and load bearing capacity.

[0005] Hence, there is a need for a design for a joint connection that does not necessarily require welding or fasteners, yet provides a stable, load bearing connection.

BRIEF SUMMARY OF THE INVENTION

[0006] It is, therefore, an object of the present invention to provide an improved method of fastening materials.

[0007] It is, therefore, an object of the present invention to provide an improved method of fastening materials without necessarily requiring welding or fasteners, although welding and fasteners are not necessarily excluded, and, in some situations, may be required.

[0008] An additional object of the present invention is to provide an improved method of fastening materials together in such a way that stability and load bearing capacity are provided, along with coupling the materials together.

[0009] A further object of the present invention is the provision of a fastening system that provides an inexpensive method of fastening materials together and reducing necessary parts.

[0010] Yet another object of the present invention is that the fastening system and method are not limited to any particular size of application, but span applications such as, for example, but not limited to, temporary buildings, scaffolding, ladders, fencing, farm gates, fences, traffic control structures, bridges and tunnels, to structures on the nano-scale.

[0011] Another object of the present invention is that the fastening system and method are not limited in the type of the materials used, and may be applied to materials ranging from, for example, but not limited to, plastics, metals, composites, wood, ceramics, silica products, animal tissues, including human, fiberglass, cardboard, and materials used in the field of nanotechnology, such as, for example, molecular capillary catheters and probes, such as for cell counters and the like.

[0012] In one embodiment, the present invention is directed to a joint connection, comprising a stabilizing surface having at least one opening, a securing surface having at least one tab-slot, and a member having at least one tab, wherein the member passes through the opening in the stabilizing surface, and the tab engages the tab-slot in the securing surface.

[0013] In one embodiment of the joint connection, the stabilizing surface and the securing surface are in a common surface. In one embodiment of the joint connection, the stabilizing surface and the securing surface are both in the outer surface of a post. In one embodiment of the joint connection, the stabilizing surface and the securing surface are not both in a common surface.

[0014] In one embodiment of the joint connection, the stabilizing surface is substantially parallel to the securing surface.

[0015] In one embodiment of the joint connection, the member may be solid, hollow, or partially filled. In one embodiment of the joint connection, the post may be solid, hollow, or partially filled.

[0016] In one embodiment of the joint connection, the opening corresponds in shape and size to the member. In one embodiment of the joint connection, the member passes snugly through the opening. In one embodiment of the joint connection, a sealant is located along an edge of the opening. In one embodiment of the joint connection, a sealant is located along an edge of the tab-slot.

[0017] In one embodiment of the joint connection, the opening is located directly opposite to at least one tab-slot. In one embodiment of the joint connection, the longitudinal axis of the member is oriented at an angle of about 90° relative to the longitudinal axis of the stabilizing surface. In one embodiment of the joint connection, the opening is not directly

opposite at least one tab-slot, but is offset from at least one tab-slot. In one embodiment of the joint connection, the longitudinal axis of the member is oriented relative to the longitudinal axis of the stabilizing surface at a non-90° angle. In one embodiment of the joint connection, when the longitudinal axis of the member is oriented relative to the longitudinal axis of the stabilizing surface at a non-90° angle, the opening or openings and tab-slot or tab-slots may be angled such that the surface of the member makes contact with the surface of the edge of the opening or openings and the surface of the edge of the tab-slot or tab-slots.

[0018] In one embodiment of the joint connection, the angle at which the member interacts with the opening results in friction and grip between the member and the opening.

[0019] In one embodiment of the joint connection, there are more than one tabs on the member. In one embodiment of the joint connection, the number of the tabs corresponds to the number of the tab-slots. In one embodiment of the joint connection, the number of the tabs is different from the number of the tab-slots.

[0020] In one embodiment of the joint connection, the size and shape of the tab-slots corresponds to the tabs.

[0021] In one embodiment of the joint connection, the member is separate from the stabilizing surface and the securing surface, except at the opening. In one embodiment of the joint connection, the member is coupled to itself at the opening.

[0022] In one embodiment of the joint connection, the tab is bent or crimped over an edge of the tab-slot to engage the tab-slot. In one embodiment of the joint connection, the tab is glued in place in the tab-slot to engage the tab-slot. In one embodiment of the joint connection, the tab may additionally be welded in place in the tab-slot to engage the tab-slot. In one embodiment of the joint connection, the tab is pinned in place in the tab-slot to engage the tab-slot. In one embodiment of the joint connection, the tab is held in place in the tab-slot by a cam bolt, twisted to lock the tab in place.

[0023] In one embodiment of the joint connection, the joint connection is produced by a process wherein the tab-slot is cut by a laser. In one embodiment of the joint connection, the joint connection is produced by a process wherein the opening is cut by a laser. In one embodiment, opening is made by a process such as, for example, penetration by the member, or

by other cutting, punching, forging or casting methods, such as, but not limited to, water jet cutting, plasma torch, oxyacetylene torch, hydrogen arc, or electric discharge machining ("EDM").

[0024] In one embodiment of the joint connection, the joint connection has at least one recess in the securing surface.

[0025] In one embodiment, the present invention is directed to a method of joining, comprising the steps of: providing at least one stabilizing surface, comprising at least one opening; providing at least one securing surface, comprising at least one tab-slot; providing at least one member, comprising at least one tab; passing said member through said opening; and passing said tab into said tab-slot.

[0026] In one embodiment of the method of the present invention, the stabilizing surface and the securing surface are in a common surface. In one embodiment of the method of the present invention, the stabilizing surface and the securing surface are both in the outer surface of a post. In one embodiment of the method of the present invention, the stabilizing surface and the securing surface are not both in a common surface.

[0027] In one embodiment of the method of the present invention, the stabilizing surface is substantially parallel to the securing surface.

[0028] In one embodiment of the method of the present invention, the member may be solid, hollow, or partially filled. In one embodiment of the method of the present invention, the post may be solid, hollow, or partially filled.

[0029] In one embodiment of the method of the present invention, the opening in the stabilizing surface corresponds in shape and size to the member. In one embodiment of the method of the present invention, the member passes snugly through the opening. In one embodiment of the method of the present invention, a sealant is located along an edge of the opening. In one embodiment of the method of the present invention, a sealant is located along an edge of the tab-slot.

[0030] In one embodiment of the method of the present invention, the opening is located directly opposite to at least one tab-slot. In one embodiment of the method of the present invention, the longitudinal axis of the member is oriented at an angle of about 90° relative to the

longitudinal axis of the stabilizing surface. In one embodiment of the method of the present invention, the opening is not directly opposite at least one tab-slot, but is offset from at least one tab-slot. In one embodiment of the method of the present invention, the longitudinal axis of the member is oriented relative to the longitudinal axis of the stabilizing surface at a non-90° angle.

[0031] In one embodiment of the method of the present invention, the angle at which the member interacts with the opening results in friction and grip between the member and the opening.

[0032] In one embodiment of the method of the present invention, there are more than one tabs on the member. In one embodiment of the method of the present invention, the number of the tabs corresponds to the number of the tab-slots. In one embodiment of the method of the present invention, the number of the tabs is different from the number of the tab-slots.

[0033] In one embodiment of the method of the present invention, the size and shape of the tab-slots corresponds to the tabs.

[0034] In one embodiment of the method of the present invention, the member is separate from the stabilizing surface and the securing surface, except at the opening. In one embodiment of the method of the present invention, the member is coupled to itself at the opening.

[0035] In one embodiment of the method of the present invention, the tab is bent or crimped over an edge of the tab-slot to engage the tab-slot. In one embodiment of the method of the present invention, the tab is glued in place in the tab-slot to engage the tab-slot. In one embodiment of the method of the present invention, the tab may additionally be welded in place in the tab-slot to engage the tab-slot. In one embodiment of the method of the present invention, the tab is pinned in place in the tab-slot to engage the tab. In one embodiment, the tab is bent over an edge of the tab-slot into a recess in the securing surface, such that the tabs are flush with the securing surface.

[0036] In one embodiment, the present invention is directed to a kit for assembling a joint connection. In one embodiment of the present invention, the joint kit has component parts capable of being assembled into one or more joints. In one embodiment, the kit comprises a combination of: at least one post, capable of being joined to at least one member; and at least one

member, capable of being joined to at least one post; wherein the post comprises: a stabilizing surface, comprising at least one opening, and a securing surface, comprising at least one tab-slot; and wherein the member comprises: at least one tab; further wherein the member is capable of penetrating the opening in the stabilizing surface of the post; and wherein the tab on the member is capable of engaging the tab-slot in the securing surface of the post, whereby the member may be joined to the post.

[0037] In one embodiment of the kit of the present invention, the post or posts and cross member or cross members may be any shape or size, and it is not a requirement that the post or posts and cross member or cross members be the same shape or comprised of the same material.

[0038] In one embodiment of the kit of the present invention, the kit may be assembled in a desired location, or partially or fully preassembled and shipped to another location.

[0039] In one embodiment of the kit of the present invention, the stabilizing surface and the securing surface are in a common surface. In one embodiment of the kit of the present invention, the stabilizing surface and the securing surface are both in the outer surface of a post. In one embodiment of the kit of the present invention, the stabilizing surface and the securing surface are not both in a common surface.

[0040] In one embodiment of the kit of the present invention, the stabilizing surface is substantially parallel to the securing surface.

[0041] In one embodiment of the kit of the present invention, the member may be solid, hollow, or partially filled. In one embodiment of the kit of the present invention, the post may be solid, hollow, or partially filled.

[0042] In one embodiment of the kit of the present invention, the opening corresponds in shape and size to the member. In one embodiment of the kit of the present invention, the member passes snugly through the opening. In one embodiment of the kit of the present invention, a sealant is located along an edge of the opening. In one embodiment of the kit of the present invention, a sealant is located along at least one edge of the tab-slot.

[0043] In one embodiment of the kit of the present invention, the opening is located directly opposite to at least one tab-slot. In one embodiment of the kit of the present invention, the longitudinal axis of the member is oriented at an angle of about 90° relative to the longitudinal axis of the stabilizing surface. In one embodiment of the kit of the present invention, the opening is not directly opposite at least one tab-slot, but is offset from at least one tab-slot. In one embodiment of the kit of the present invention, the longitudinal axis of the member is oriented relative to the longitudinal axis of the stabilizing surface at a non-90° angle. In one embodiment of the kit of the present invention, when the longitudinal axis of the member is oriented relative to the longitudinal axis of the stabilizing surface at a non-90° angle, the opening or openings and tab-slot or tab-slots may be angled such that the surface of the member makes contact with the surface of the edge of the opening or openings and the surface of the edge of the tab-slot or tab-slots.

[0044] In one embodiment of the kit of the present invention, the angle at which the member interacts with the opening results in friction and grip between the member and the opening. In one embodiment of the kit of the present invention, the opening or openings may be angled in a manner to maximize the contact between the surface of the member and the surface of the edge of the opening or openings in a manner to maximize the friction and grip between the member and the opening. In one embodiment of the kit of the present invention, the tab-slot or tab-slots may be angled in a manner to maximize the contact between the surface of the tab and the surface of the edge of the tab-slot or tab-slots in a manner to maximize the friction and grip between the tab and the tab-slot or tab-slots.

[0045] In one embodiment of the kit of the present invention, there are more than one tabs on the member. In one embodiment of the kit of the present invention, the number of the tabs corresponds to the number of the tab-slots. In one embodiment of the kit of the present invention, the number of the tabs is different from the number of the tab-slots.

[0046] In one embodiment of the kit of the present invention, the size and shape of the tab-slots corresponds to the tabs.

[0047] In one embodiment of the kit of the present invention, the member is separate from the stabilizing surface and the securing surface, except at the opening. In one embodiment of the kit of the present invention, the member is coupled to itself.

[0048] In one embodiment of the kit of the present invention, the tab is bent or crimped over an edge of the tab-slot to engage the tab-slot. In one embodiment of the joint connection, the tab is glued in place in the tab-slot to engage the tab-slot. In one embodiment of the joint connection, the tab is welded in place in the tab-slot to engage the tab-slot. In one embodiment of the joint connection, the tab is pinned in place in the tab-slot to engage the tab-slot. In one embodiment of the joint connection, the tab need not be crimped or bent, for example, it may be pinned in place or simple remain protruding through the tab-slot, providing for ready assembly and disassembly, and for example reassembly, of the joint.

[0049] In one embodiment of the kit of the present invention, the joint connection is produced by a process wherein the tab-slot is cut by a laser. In one embodiment of the kit of the present invention, the joint connection is produced by a process wherein the opening is cut by a laser. In one embodiment, opening is made by a process such as, for example, penetration by the member, or by other cutting, punching, forging or casting methods, such as, but not limited to, water jet cutting, plasma torch, oxyacetylene torch, hydrogen arc, or electric discharge machining ("EDM").

[0050] In one embodiment, the present invention is directed to a construction, such as, but not limited to, temporary buildings, scaffolding, ladders, fencing, farm gates, fences, traffic control structures, exotic and domestic animal pens, support beams, components of sheets of materials such as cardboard and fiberglass, and structures on the nano-scale, comprising at least one joint connection as described herein.

[0051] The foregoing has outlined rather broadly the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional objects, features, and advantages of the invention will be described hereinafter which form the subject of the claims of the invention. It should be appreciated that the conception and specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized that such equivalent constructions do not depart from the invention as set forth in the appended claims. The novel features which are believed to be characteristic of the invention, both as to its organization and method of operation, together with further objects and advantages will be better understood from the following description when considered in connection with the accompanying figures. It is to be expressly understood,

however, that each of the figures and examples are provided for the purpose of illustration and description only and are not intended as a definition of the limits of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0052] FIG. 1A is an illustrative view of one side of a post segment of the present invention;

[0053] FIG. 1B is an illustrative view of the opposite side of a post segment of the present invention;

[0054] FIG. 2 is an exploded view of one embodiment of the present invention;

[0055] FIG. 3A is an illustrative view of one embodiment of the present invention wherein tabs are aligned with tab-slots and inserted into tab-slots;

[0056] FIG. 3B is an illustrative view of one embodiment of the present invention showing three components securely coupled together with tabs bent after passing through tab-slots;

[0057] FIG. 3C is an illustrative view of one embodiment of the present invention showing three components securely coupled together with tabs deformed after passing through tab-slots, where tabs are deformed in a recess to be flush with the securing surface;

[0058] FIG. 4A is an illustrative view of yet another embodiment of the present invention showing three components securely coupled together with a bolt and nut securely coupling together the tabs after passing through tab-slots;

[0059] FIG. 4B is an illustrative view of yet another embodiment of the present invention showing three components securely coupled together with a simple pin securely coupling together the tabs after passing through tab-slots;

[0060] FIG. 4C is an illustrative view of yet another embodiment of the present invention showing three members securely coupled together, tabs having a notch engaging edge of tab-slots, and rotation of the member to lock it in place;

[0061] FIG. 5 is an illustrative view of one embodiment of the present invention wherein tabs are aligned with and inserted into tab-slots;

[0062] FIG. 6 is an illustrative view of one embodiment of the present invention wherein the cross member is at an angle and/or curved, not perpendicular, relative to the stabilizing surface of at least one stabilizing surface;

[0063] FIG. 7A is an illustrative view of one embodiment of the present invention, showing the friction or gripping action resulting when the member 700 is inserted at a non-90° angle, resulting in limited gripping action;

[0064] FIG. 7B is an illustrative view of one embodiment of the present invention, showing the friction or gripping action resulting when the member 700 is inserted at a non-90° angle, maximizing the friction or gripping action, and/or weight bearing capabilities;

[0065] FIG. 7C is an illustrative view of one embodiment of the present invention, showing the limited friction or gripping action resulting when the member 700 is inserted at a 90° angle;

[0066] FIG. 7D Figure 7D is an illustrative view of one embodiment of the present invention, showing the maximized friction or gripping action resulting when the member 700 is inserted at a 90° angle; and

[0067] FIG. 8 is an exploded view of yet another embodiment of the present invention, wherein at least two posts are coupled closely together.

DETAILED DESCRIPTION OF THE INVENTION

[0068] Before the present invention is disclosed and described, it is to be understood that this invention is not limited to any specific materials or size. It is also to be understood that the terminology used herein is for the purpose of describing particular embodiments and is not intended to be limiting.

DEFINITIONS AND USE OF TERMS

[0069] In the specification and in the claims which follow, reference will be made to a number of terms which shall be defined to have the following meanings:

[0070] It should be noted that, as used in the specification and the appended claims, the singular forms “a,” “an” and “the” include the plural form as well unless the context clearly indicates otherwise. Thus, reference to “a post segment” may include numerous post segments, for example, in a fence line, or the like. The terms “at least one,” and “one or more” refer to the singular or the plural.

[0071] The term “post,” as used herein, refers to one or more segments to which a common member is attached, and generally has both a stabilizing surface and a securing surface. A post may also refer to separate stabilizing and securing surfaces that are not part of a unified structure, but are used in combination. The term “post” as used herein may include, for example, a rod, a pole, a tube, a stake, a beam, a marker, a pair comprising a stabilizing surface and a securing surface, or a support of any kind. The term “post” refers to hollow, solid, and partially filled members. In one embodiment, the posts are galvanized, plain, plated or painted metal pipe, or are wood, plastic or cement, and are employed in the present invention as, for example, the vertical uprights serving as support. However, in other embodiments, the posts are not necessarily vertical uprights. In another embodiment, one end of the post may be buried underground or alternatively, cemented in place. In another embodiment, concrete or cement may be used to secure the end of the post in one place underground. In yet another embodiment, dirt may be tightly packed to secure the end of the post in one place underground. In another embodiment, the post may be driven into the ground. In another embodiment, the post may be bolted to studs protruding from concrete, wood, plastic or other material above or below ground level. In yet another embodiment, the post may include or comprise mesh tubing, for example, oil well screens and nanotube comprised of a mesh. In an embodiment having more than one post, posts may be dissimilar, for example, in composition and size.

[0072] The term “tab,” as used herein, refers to any flange, projection, flap, protrusion, or the like, extending from a common member. The tab may vary in length, shape and thickness, material, color, hardness, coating, plating, painting, and the like, as necessary for the desired application, and may be comprised of different material than the member. The tab may be threaded to accept a nut, screwed thereon, for example, as a means of attachment. The tab may be made in any manner, such as, for example, by machining, laser cutting, protrusion, or molding. A tab may also include a hole, which may or may not be threaded. The tab may also be notched to allow it to engage with the tab-slot.

[0073] The term “tab-slot,” as used herein, refers to any space, hole, groove, slit, or the like, in the securing surface that loosely corresponds in shape and size to tabs that are inserted into the tab-slot. In one embodiment, the tab-slots are cut with a laser. In another embodiment, the tab-slots may be made or obtained in any fashion, such as, for example, by boring through the securing surface, or pre-fabricated such as by molding, forging, casting, extruding or melting. In one embodiment, the tab-slot may be made by penetration by the tabs. In one embodiment, the tab-slot may not necessarily extend completely through to the outer surface of the securing surface; for example, the tab-slot could comprise a notch in the inner surface of the securing surface that engages a tab, or the tab-slot could be made by penetration of a tab into the inner surface of the securing surface, where the tab, and hence the tab-slot, do not extend completely through the securing surface to reach the outer surface of the securing surface.

[0074] The term “opening,” as used herein, refers to any space, gap or hole in the stabilizing surface that may correspond in shape and size to the common member that is inserted into the opening, although the opening may vary in size or shape as necessary with regard for the desired application. In one embodiment, the opening is cut with a laser. In another embodiment, the opening may be made or obtained in any fashion, such as for example, by boring through the securing surface, or prefabricated such as by molding. The term “opening” as used herein includes a hole passing through a solid object, or a hole through the outer surface of a hollow object. Furthermore, the opening does not necessarily remain “open” in all stages of the invention. For example, when the joint is assembled, the member is in the opening; further, for example, in some embodiments, the opening in the assembled joint connection may be sealed. In one embodiment, the opening may be made by penetration by the member.

[0075] The term “member,” as used herein, refers to an object capable of penetrating a hole, and may include, for example, a rail, a bar, a brace, a pipe, a rod, a beam, a tube, a pole, or the like. The term “member” refers to hollow, solid and semi-filled objects. In one embodiment, the member connects to a post. In one embodiment, the member is the horizontal portion connecting at least two posts to provide stability and support, for example, to a fence brace and fence. In an embodiment having more than one member, members may be dissimilar, for example, in composition and size.

[0076] The term “pin,” as used herein, refers any object capable of securing a tab to a tab-slot, and may include, for example, a slender, usually cylindrical piece of wood or metal for

holding or fastening parts together, screws, nuts and bolts, nails, pegs, wire (e.g., stiff or malleable) and various other hardware typically used for fastening parts together, such as, for example, pins, clips, or split rings.

[0077] The term “couple,” as used herein, refers to joining, securing, connecting, or the like, items together or alternatively, joining, securing, connecting, or the like, a single item to itself. “Couple,” “coupled” or “coupling” is not limited to irreversible attachment; “couple” may refer to reversible joining, securing, connecting, or the like.

[0078] The term “attach,” as used herein, refers to joining, securing, connecting, or the like, items together or alternatively, joining, securing, connecting, or the like, a single item to itself.

[0079] The term “fasten,” as used herein, refers to joining, securing, connecting, or the like, items together or alternatively, joining, securing, connecting, or the like, a single item to itself.

[0080] The terms “couple,” “attach,” “fasten,” “join,” “joint,” and “engage” are not limited to permanent connections.

[0081] The term “engage,” as used herein, means to interlock or mesh or cause to interlock or mesh, weave, entwine, bind or thread.

[0082] The term “bent,” as used herein, refers to the tab assuming a different direction or shape. In one embodiment, the act of bending the tab may be accomplished using a mallet, hammer or pliers or other tools or processes, whether specifically designed for the task or not, whereby the tab bends around the tab-slots to secure the member.

[0083] The term “crimped,” as used herein, refers to pressing, pinching or otherwise deforming the tab to engage the tab with the tab-slot. In one embodiment, the act of crimping the tab may be accomplished using a mallet, hammer or pliers or a special tool or process.

[0084] The term “glued,” as used herein, refers to fastened with any type of adhesive. In one embodiment, an adhesive such as epoxy glue, skin glue, bone glue, BOND0®, Bondo Corporation, Atlanta, GA, and the like, may be used.

[0085] The term “sealant,” as used herein, refers to a substance, agent or device that joins items so as to prevent leakage, close in an air-tight fashion, make waterproof, or the like, and may include, for example, caulking agents, a rubberized O-ring, or specialty rubber seals such as Jons Mansfield rubber or a Mansfield seal.

[0086] The term “stabilizing surface,” as used herein, refers to any object capable of fixing another item, such as a member, for example, by preventing fluctuation, variation and resistant to movement, and may include, for example, the outer surface of a post, any part of or all of a post, a surface that is separate from and not connected to a securing surface, or a surface that may be connected to a securing surface. The term “stabilizing surface” is not limited to a surface or face of any material, item or such, and relates to any part of any material, item, or such, that has an opening that fixes another item, such as a member.

[0087] The term “securing surface,” as used herein, refers to any object capable of firmly fastening, locking, coupling, attaching or otherwise anchoring another item, such as a member, in place, and may include, for example, the outer surface of a post, any part of or all of a post, a surface that is separate from and not connected to a stabilizing surface, or a surface that may be connected to a stabilizing surface. The term “securing surface” is not limited to a surface or face of any material, item or such, and relates to any part of any material, item, or such, that has tab-slots that fasten, lock, couple, attach, or otherwise anchor another item, such as, for example, a member, in place.

[0088] The term “snugly,” as used herein, refers to closely secured or closely fitting, and not loose.

[0089] The term “substantially,” as used herein, is a term of approximation, and means for the same as or very close to that which is specified.

[0090] The term “about,” as used herein, is a term of approximation, and means reasonably close, approximately, or near.

[0091] The terms “joint,” and “joint connection,” as used herein, refer to a link, point, or other type of attachment between two or more items, where fastening or coupling may take place.

[0092] The term “construction,” as used herein, includes, but is not limited to, materials for structural strengthening designs such as support beams for roofing; support beams of airplane wings; tent-like structures, temporary buildings and hunting units such as deer stands and deer blinds; outdoor venue applications; commercial fishing applications; animal pens and fence structures; space station or space craft applications; helix-type designs; medical and/or surgical devices; agricultural grain storage and handling; ladders; antennas; water towers; irrigation equipment (for example, center pivots); petro-chemical storage tanks; highway signage structures; automotive components; motorcycle, bicycle, tricycle, and unicycle components; wildlife feeder structures; cattle handling and milking equipment; animal laboratory equipment; feedlots; all types of gates, architectural railing, fencing, stair rails, catwalks, and safety railing; scaffolding; isotainer frames; light beacon towers; construction equipment; conveyor framework of all types; sand, gravel, rock crushing equipment framework, concrete forms, oilwell perforating tubes, railroad trucks, bridges, boats, ships, and shipping containers, such as, for example, ISO containers; and can also be architectural, ornamental or artistic in design and not necessarily made for stability or strength.

[0093] Figure 1A is an illustrative view of one embodiment of the invention and shows one side of a post segment 100 of the present invention. In the figure, on the near side of the post segment 100, one or more tab-slots 110 in a securing surface 130A are shown. Opposite the one or more tab-slots 110, on the far side of the post segment 100, an opening 120 in a stabilizing surface 140A is shown. The one or more tab-slots 110 are not required to be directly across from the opening 120, but may be offset to allow fastening of materials at various angles.

[0094] Figure 1B is an alternative illustrative view of the opposite side of a post segment of the present invention. In the figure, on the near side of the post segment 100, an opening 120 in a stabilizing surface 140B is shown. Opposite the opening 120, on the far side of the post segment 100, one or more tab-slots 110 in a securing surface 130B are shown. Again, the one or more tab-slots 110 are not required to be directly across from the opening 120, but may be offset to allow fastening of materials at various angles.

[0095] In one embodiment shown in Figure 1A and alternatively shown in Figure 1B, the openings and tab-slots are cut into tubing used for post segments using a laser, and the tubing is later galvanized. Particularly useful for cutting the tab-slots and openings is the 6-Axis tube laser, and the like, available from Mazak Corporation, www.mazakusa.com.

[0096] In one embodiment, the edge of the opening 120 may be lined with a sealant. A sealant may be added along the edge of the opening 120 in any application wherein it is desirable to prevent fluids, gases, or dry materials from accumulating inside the post segment, or alternatively, keep such materials in. A sealant may be particularly desirable in any application wherein caustic materials are used to clean the joint connection. In another embodiment, the tab-slots 110 may be lined with a sealant, for similar reasons. In particular, a silicon sealant may be used.

[0097] Figure 2 is an exploded view of one embodiment of the present invention. A first post segment 200 is shown, as well as a second post segment 210. The first post segment 200 has one or more tab-slots 220 in a securing surface 205 and an opening 230 in a stabilizing surface 202, as shown, the side opposite to the tab-slots 220. The tab-slots 220 on the first post segment 200 may be of any size, shape, and number, depending on what is necessary for the particular application. The second post segment 210 has one or more tab-slots 240 in a securing surface 215 and an opening 250 in a stabilizing surface 212, as shown, on the side opposite to the tab-slots 240. The tab-slots 240 of the second post segment 210 also may be of any size, shape, and number, depending on what is necessary for the particular application. A member 260 is shown, to be coupled to the first post segment and the second post segment. The member 260 also includes tabs 270A on one end, and tabs 270B on the other end. The opening 230 in the first post segment 200 and the opening 250 of the second post segment 210 correspond in shape and size to the common member 260, according to the various needs for the particular application.

[0098] In one embodiment of the present invention, the member may be a capillary tube and/or be of capillary tube dimensions, for example, having a diameter measured in the micron range. In one embodiment, the member is at least one capillary tube having at least one tab protruding from its end. The member may also have a hole, or other such structure, located near the tabs. In one embodiment, the member is used, for example, in obtaining a blood sample. In one such embodiment, the member may be used to pierce a hole in the wall of a blood vessel, and the tabs used to pierce the opposite wall of the blood vessel. In this way, the inventive joint may be constructed using a capillary tube as the member, and the walls of a blood vessel or capillary as the supporting and stabilizing surfaces. For example, insertion of the member into a blood vessel creates the opening in the supporting surface of the blood vessel, and piercing by the tabs creates the tab-slots in the securing surface of the opposite wall of the blood vessel –

thus forming the inventive joint connection. When, for example, such a capillary tube is inserted into a blood vessel, the tube may also contain a hole or other structure located near the tab end, such that, when the member is inserted into a blood vessel and the tabs are inserted in the tab-slots – forming the inventive joint connection – the hole or other structure is located such that it is within the interior of the blood vessel, and thus within the flow of blood. In one embodiment, for example, by appropriately designing the hole or other structure, it can be used to obtain a blood sample or to obtain one or more other specific types of samples from the blood. For example, the hole could be sized such that it accepts red blood cells but not white blood cells. This would provide for a means of selectively sampling RBCs in an animal, including humans, with minimal effort and minimal invasiveness. For example, the diameter of the hole on the capillary tube could be, for example, about 5 microns. It is known in the art that RBCs may pass through an opening of about this size, while WBCs will not. This thus provides a method for selectively collecting RBCs from the blood of a living animal with minimal effort and invasiveness. In another embodiment, the hole may receive certain blood gases or plasma, making a device and method for selectively measuring and/or obtaining a specific blood component in an animal, such as a human, livestock or a companion animal. In a similar manner, the invention may be used to introduce compounds into the blood stream, such as drugs or sensors, such as dyes, and the like. The device may also be used as a probe or sensor.

[0099] In one embodiment, the member and other components of the joint connection are in the nanoscale range of size, for example, having dimensions measured in nanometers, or smaller. This may include, for example, molecular manufacturing, molecular devices and use of such, as well as, for example, devices on the molecular and atomic scale.

[0100] In one embodiment of the present invention, one end of the member 260 is inserted into the opening 230 in a stabilizing surface 202 of the first post segment 200. The member 260 passes through the first post segment 200. The member 260 is aligned with the first post segment 200 such that the member 260 fits through the opening 230 in a stabilizing surface 202, and the tabs 270A can be inserted into the tab-slots 220 in a securing surface 205. Also in one embodiment of the present invention, the other end of the common member 260 is inserted into the opening 250 in a stabilizing surface 212 of the second post segment 210. The common member 260 passes through the second post segment 210. The common member 260 is also aligned with the second post segment 210 such that the common member 260 fits through the

opening 250 in the stabilizing surface 212, and the tabs 270B can be inserted into the tab-slots 240 in the securing surface 215. In the embodiment shown in Figure 2, the tabs 270A and 270B may be bent, crimped, twisted, rotated, for example to engage a notch, or glued in place to securely fasten the members. Alternatively, the tabs may also be pinned or screwed together to securely fasten the members as shown in Figures 4A and 4B. Additionally, the member 260 may be symmetrical, such that the ends may fit to either post, and the member may be attached regardless of the orientation in which it is inserted through the openings 230 and 250. Alternatively, the member 260 may be asymmetrical.

[0101] Passing the common member 260 through the opening in each post segment affords an added measure of stability, and adds to the load bearing capacity of the present invention. Inserting the tabs into the tab-slots in each post segment affords a locking capacity to allow the members to be coupled together. This, for example, also increases the ability of the joints to retain the desired design, for example, squareness, and the like.

[0102] The first post segment 200, the second post segment 210 and the member 260 may be composed of various and/or different materials, such as, for example, galvanized tubing, metal, plastic, wood composites, paper, cardboard, tissue, silicone, glass, teflon, clay, concrete, rubber, vinyl, carbon and carbon molecules, ceramic, woven wire, woven materials, woven tubing, and other mesh and mesh-like constructions. Particularly, the first post segment 200, the second post segment 210 and the member 260 may be composed of painted tubing. The size of all of the components can vary anywhere from very small, for applications in the field of nano-technology, all the way to very large, for applications in, for example, building framing, scaffolding, large farm gates, and airport fencing or containment assemblies. In one preferred embodiment, the components are less than 11" in diameter and less than 24' long. The various components of the present invention may be hollow, to allow for lightweight construction, or may be solid, to provide added stability and sturdiness.

[0103] In one embodiment, the tabs may be used, for example, both as tabs, as defined herein for engaging a tab-slot, and as saw teeth. For example, the tab end of the member could have one or more angled, sharpened, or sawtooth-like tabs. In this embodiment, the tab end of the member may resemble the sawtooth end of a hole saw. In assembling the inventive joint connection, the member may be rotated such that the tabs cut an opening in the stabilizing surface. Penetration of the opening by the member then allows for the tabs to engage in tab-slots

in the stabilizing surface; these tab-slots may be preexisting or may be made by the tabs, for example, by penetration of the tabs. In one embodiment, the tab-slots may extend through the stabilizing surface such that the tabs may extend to or beyond the outer surface of the stabilizing surface. In such an embodiment, the tabs may be engaged with the tab-slots in the stabilizing surface as discussed herein, for example, by bending, twisting or crimping. In another embodiment, the tab-slots may only penetrate the inner surface of the stabilizing surface, such that the tabs are secured in the tab-slots. These embodiments, as with others described herein, may be used in a wide variety of applications, ranging from, for example, use in large scale mechanical structures to small biotechnology uses, such as, for example, bone stabilizing devices or internal body probes or sensors.

[0104] Figure 3A is an illustrative view of one embodiment of the present invention wherein tabs are aligned with and inserted into tab-slots. The first post segment 300 and the second post segment 310 can be coupled together by common member 320. The common member 320 is inserted into an opening 330 in a stabilizing surface 302 on the first post segment 300 and an opening 340 in a stabilizing surface 312 on the second post segment 310. As shown in figure 3A, the common member 320 passes through both the first post segment 300 and the second post segment 310. On the opposite side to the opening 330, tab-slots 350 are in a securing surface 305 of the first post segment 300. Tabs 370 on the end of common member 320 are inserted into the tab-slots 350. The tabs 370 may extend all the way through the tab-slots 350 to the exterior of the first post segment 300, or may be longer to extend out of the tab-slots or shorter to be flush with the securing surface. On the opposite side to the opening 340 of the second post segment 310, tab-slots 360 are in a securing surface 315 of the second post segment 310. Tabs 380 on the end of common member 320 are inserted into the tab-slots 360. The tabs 380 may extend all the way through the tab-slots 360 to the exterior of the second post segment 310, or may be longer to extend out of the tab-slots or shorter to be flush with the securing surface.

[0105] In one embodiment, the tab end of the member may be cut such that it fits flush against the inner surface of the stabilizing surface when the tabs are engaged with the tab-slots. For example, if the stabilizing surface is on a hollow post, the tab end of the member could be cut such that it fits flush against the internal diameter of the stabilizing surface when the tabs are engaged in the tab-slots. One example is shown in Figure 3A, wherein the tab ends of

common member 320 fit flush against the inner surfaces/inner diameters of securing surfaces 305 and 315 when the tabs are engaged in the tab-slots. In an optional embodiment, the flush fitting of the tab end of the member with the inner surface (e.g., inner diameter) of the stabilizing surface may be sealed, for example, with a silicon sealer or similar sealing means.

[0106] Figure 3B is an illustrative view of one embodiment of the present invention showing three components securely coupled together with tabs deformed after passing through tab-slots. After the tabs 370 and 380 on each end of the common member 320 are aligned and inserted into the tab-slots 350 and 360, the tabs 370 and 380 are deformed by bending, crimping, twisting, gluing, engaging a notch, for example, by rotating the member, or other method to lock the members into place in the securing surfaces 305 and 315. This may be done by heating the tabs and/or using, for example, a hammer, mallet, rock, gun butt, wrench, shovel, spent artillery shell case, junk iron, among other tools or items that one may find useful. The method of locking the tabs 370 and 380 into place may depend on the material used to comprise the common member 320 or according to need for the particular application, for example, if the tabs 370 and 380 will need to be unlocked at any point in time, or moved and reassembled in another arrangement.

[0107] Figure 3C is an illustrative view of one embodiment of the present invention showing three components securely coupled together with tabs deformed after passing through tab-slots, where tabs are deformed in a recess to be flush with the securing surface. In the securing surfaces 305 and 315, there are recesses 390 adjacent to each tab-slot 350 and 360. After the tabs 370 and 380 on each end of the member 320 are aligned and inserted into the tab-slots 350 and 360, the tabs 370 and 380 are deformed by bending, crimping, twisting, gluing or other method to lock the members into place in the securing surfaces 305 and 315. This may be done by heating the tabs and/or using, for example, a hammer, mallet, rock, gun butt, wrench, shovel, spent artillery shell case, junk iron, among other tools or items that one may find useful. The tabs 370 and 380 are bent or crimped into the recesses 390 such that the tabs 370 and 380, once secure, lay flush with the securing surfaces 305 and 315. The method of locking the tabs 370 and 380 into place may depend on the material used to comprise the member 320 or according to need for the particular application, for example, if the tabs 370 and 380 will need to be unlocked at any point in time, or moved and reassembled in another arrangement.

[0108] Figure 4A is an illustrative view of yet another embodiment of the present invention showing three components securely coupled together with a nut and bolt securely coupling together the tabs after passing through tab-slots. A first post segment 400 is coupled to a second post segment 410 by a member 420 with tabs 470 protruding from one end and tabs 480 protruding from the other end. One end of the member 420 is inserted through an opening 430 in a stabilizing surface 402 in the first post segment 400 and the other end of the member 420 is inserted through an opening 440 in a stabilizing surface 412 in the second post segment 410. The member 420 passes through both the first post segment 400 and the second post segment 410. On the side opposite to the opening 430, there are tab-slots 450 in a securing surface 405 on the first post segment 400. When the member 420 is aligned properly, the tabs 470 fit through the tab-slots 450. On the side opposite the opening 440, there are tab-slots 460 in a securing surface 415 on the second post segment 410. When the member 420 is aligned, the tabs 480 fit through the tab-slots 460. In the embodiment shown in Figure 4A and 4B, the tabs 470 and 480 contain holes through which a pin, screw, rivet, split ring, cam bolt, or any other type of fastener 490 may be placed. Such holes may additionally be threaded. In the embodiment shown in Figure 4A using a fastener that is not incorporated into the member 420, the advantage is that one may take the entire assembly apart, move it around, and reassemble it as many times as necessary, and re-assembly will not require welding or special skills.

[0109] In the embodiment shown in Figure 4B, a simple pin 490 may alternatively be inserted through the tabs 470 and 480 to hold the tabs 470 and 480 in the tab-slots 450 and 460. Alternatively, a pin 490 may lock the tab in place by using a cam action. For example, pin 490 or the like, may have an asymmetrical component, such as a cam bolt, cam nut, cam socket head, or other portion having a cam-like, offset protrusion, wherein when the pin or the like is turned, the offset cam component becomes wedged against the outer surface of the stabilizing surface, thereby it locking the tab in place. Alternatively, a pin 490 may be threaded, and placed through one or more threaded holes in the tabs 470 and 480. For example, where a threaded pin or the like passes through two opposing tabs, one hole in one tab may be a non-threaded through hole and the opposing hole be threaded, for accepting and securing the threaded pin.

[0110] In the alternative embodiment shown in Figure 4C, the tabs 480 may also comprise a notch, such that when the member 420 is inserted through the opening 440 in the stabilizing surface 412 and the tabs 480 are inserted through the tab-slots 460 in the securing

surface 415, the notch in each of the tabs 480 engages with an edge of the corresponding tab-slots 460. The notch may be oriented in many different directions relative to tab-slots 460 (e.g., top, bottom, or sides), so long as at least one tab 480 engages tab-slot 460 via the notch. In one embodiment, the member may be rotated to engage the tab with the tab-slot via the notch. In another embodiment, a common member, such as common member 420 for example, may have notched tabs on each end, with the notches oriented such that rotation of the member in one direction engages notched tabs on both ends of the common member with their corresponding tab-slots.

[0111] In another embodiment, the tab may be spring-like, such that it compresses when inserted into and through the tab-slot from the internal side of the securing surface, and then, once through the slot, expands on the outer surface of the securing surface, and secures the tab in place. In such an embodiment, the spring-like tab may reversibly or irreversibly engage the tab in the tab-slot.

[0112] Figure 5 is an illustrative view of one embodiment of the present invention wherein tabs are aligned with and inserted into tab-slots. A stabilizing surface 500 is provided, having an opening 510. Additionally a securing surface 520 is provided, having one or more tab-slots 530. In one embodiment, the stabilizing surface 500 and the securing surface 520 may be common to a single object, such as a post. In another embodiment, the stabilizing surface 500 and the securing surface 520 may also be separate objects, that may or may not attach to each other at any point other than at the described joint. The cross member 540 may be passed through the opening 510 in the stabilizing surface 500. The stabilizing surface 500 may keep the member from wiggling or weakening when the cross member is engaged with the securing surface. The cross member may also stabilize the securing surface. The cross member 540 has one or more tabs 550. The one or more tabs 550 are aligned with and inserted into the tab-slots 530. In one embodiment, the tabs 550 may be deformed by bending or crimping them to lock the tabs 550 in place in the tab-slots 530. In another embodiment, the tabs 550 may be glued to lock the tabs 550 in place in the tab-slots 530. In yet another embodiment, the tabs 550 may be welded in place to lock the tabs 550 in place in the tab-slots 530.

[0113] Figure 6 is an illustrative view of one embodiment of the present invention wherein the cross member is at an angle, not perpendicular, relative to the stabilizing surface of at least one stabilizing surface. It is not always desirable for the cross member 600 to be

connected at an angle perpendicular to a post. In various applications, it may be desirable that the longitudinal axis of the member is oriented at non-90° angle relative to the longitudinal axis of the stabilizing surface. As shown in the embodiment illustrated in Figure 6, the cross member 600 may be coupled to the posts 610 and 620 at a specific angle, as needed for the application. As described above, the cross member 600 passes through an opening 630 in a stabilizing surface 612 in post 620, and the tabs 640 pass through tab-slots 650 in a securing surface 615. The tabs 640 are deformed, pinned in place, or welded in the tab-slots 650 to couple the cross member 600 to the post 620. In this embodiment, the tab-slots 650 in the securing surface 615 are located higher or lower than the opening 630, in order to allow the cross member 600 to enter the opening 630 at an angle and lock to the post 620 through the tab-slots 650 at an angle. The cross member 600 passes through an opening 660 in a stabilizing surface 602 in post 610, and the tabs 670 pass through tab-slots 680 in a securing surface 605. The tabs 670 are deformed, pinned in place, or welded in the tab-slots 680 to couple the cross member 600 to the post 610. In this embodiment, the tab-slots 680 in the securing surface 605 are located higher or lower than the opening 660, in order to allow the cross member 600 to enter the opening 660 at an angle and lock to the post 610 through the tab-slots 680 at an angle. In this embodiment, further stability results from a gripping action created by friction between the cross member 600 and the edges of the openings 630 and 660. Similarly, in this embodiment, further stability results from a gripping action created by friction between the member 600 and the edges of the tab-slots 650 and 680. The friction and gripping action result from external forces that would otherwise destabilize the structure.

[0114] Figure 7A is an illustrative view of one embodiment of the present invention, showing the friction or gripping action resulting when the member 700 is inserted at a non-90° angle. The member 700 passes through an opening 730 in the stabilizing surface 702. The tabs 740 on the member 700 pass through the tab-slots 750 in the securing surface 705. In the embodiment shown in Figure 7A, the depth of the surfaces of the opening 730 and the tab-slots 750 are at a 90° angle through the stabilizing surface 702 and the securing surface 705 respectively. In the embodiment shown in Figure 7A, the contact, and hence, for example the friction resulting from external forces, is limited to contact between the edge of the surface of the opening 730 in the stabilizing surface 702, and the member 700, rather than with the full depth of the surface of the opening. Additionally, the contact and friction between the surface of the tab-slots 750 in the securing surface 705 and the member 700 is similarly limited.

[0115] In one embodiment, the tab end of the member may be cut such that it fits flush against the inner surface of the stabilizing surface when the tabs are engaged with the tab-slots. For example, if the stabilizing surface is on a hollow post, the tab end of the member could be cut such that it fits flush against the internal diameter of the stabilizing surface when the tabs are engaged in the tab-slots. For example, where the member is at a non-90° angle relative to the securing surface, the tab end of the member is shaped such that it forms a flush connection with the inner surface of the securing surface with the tabs are engaged in the tab-slots. For example, Figure 7A, shows an example wherein the tab end of member 700 fits flush against the inner surface of securing surface 705 when the tabs are engaged in the tab-slots. In an optional embodiment, the flush fitting of the tab end of the member with the inner surface (e.g., inner diameter) of the stabilizing surface may be sealed, for example, with a silicon sealer or similar sealing means.

[0116] Figure 7B is an illustrative view of one embodiment of the present invention, showing contact and the friction or gripping action resulting when the member 700 is inserted at a non-90° angle, but the contact is maximized, thus the friction or gripping action is maximized. The member 700 passes through an opening 730 in the stabilizing surface 702. The tabs 740 on the member 700 pass through the tab-slots 750 in the securing surface 705. In the embodiment shown in Figure 7B, the opening 730 is cut at an angle through the stabilizing surface 702 such that the angle of the depth of the surface of the opening 730 generally corresponds to the angle of insertion of the member 700, and thus the member 700 makes full contact along the surface of the opening 730 in the stabilizing surface 702. In the embodiment shown in Figure 7B, the tab-slots 750 are also cut at an angle through the securing surface 705 such that the angle of the surface of the tab-slots 750 generally corresponds to the angle of insertion of the tabs 740, and the tabs 740 make full contact along the surface of the tab-slots 750 in the securing surface 705. The maximized contact between the member and the surface of the opening and the maximized contact between the tabs and the surface of the tab-slots maximizes the strength of the joint and the friction and resulting gripping action created by external forces.

[0117] Figure 7C is an illustrative view of one embodiment of the present invention, showing the contact and friction or gripping action resulting when the member 700 is inserted at a 90° angle. The member 700 passes through an opening 730 in the stabilizing surface 702, where the edge of the depth of the opening 730 is at a non-90° angle, such as may

be created by punching to manufacture the opening. The tabs 740 on the member 700 pass through the tab-slots 750 in the securing surface 705, where the edge of the tab-slots 750 are at a non-90° angle. In the embodiment shown in Figure 7C, the contact and hence the support and friction resulting from external forces is limited in that contact between the edge of the surface of the opening 730 in the stabilizing surface 702 and the member 700. Additionally, the same applies for contact between the edge of the surface of the tab-slots 750 in the securing surface 705 and the member 700.

[0118] Figure 7D is an illustrative view of one embodiment of the present invention, showing the contact, support and the friction or gripping action resulting when the member 700 is inserted at a 90° angle, and the member 700 passes through an opening 730 in the stabilizing surface 702, where the depth edge of the opening 730 is at a 90° angle. In the embodiment shown in Figure 7D, contact between the surface of the opening 730 in the stabilizing surface 702 and the member 700 is maximized or in full contact. In the embodiment shown in Figure 7D, the tab-slots 750 are also cut at a 90° angle through the securing surface 705 such that full contact with the surface of the tab-slot is similarly possible.

[0119] Figure 8 is an exploded view of yet another embodiment of the present invention, wherein at least two posts are coupled closely together. The first post segment 800 and the second post segment 810 can be coupled together by member 820. The member 820 is supported by a stabilizing surface 802 on the first post segment 800 and in a stabilizing surface 812 on the second post segment 810. Tab-slots 850 are located in a securing surface 805 of the first post segment 800. Tabs 870 on the common member 820 are inserted into the tab-slots 850 in the securing surface 805. The tabs 870 may extend all the way through the tab-slots 850 to the exterior of the first post segment 800, or may be shorter to be flush with the securing surface 805. Tab-slots 860 are in a securing surface 815 of the second post segment 810. Tabs 880 on the member 820 are inserted into the tab-slots 860 in the securing surface 815 of the second post segment 810. The tabs 880 may extend all the way through the tab-slots 860 to the exterior of the second post segment 810, or may be shorter to be flush with the securing surface 815. As shown in Figure 8, the two posts are coupled closely together when the tabs 870 and 880 are bent, crimped, welded, pinned, or otherwise engaged in the tab-slots 850 and 860 as previously discussed.

[0120] The following examples are put forth so as to provide those of ordinary skill in the art with a complete disclosure and description of how the invention claimed herein is made and applied, and are intended to be purely exemplary of the invention and are not intended to limit the scope of what the inventors regard as their invention.

[0121] EXAMPLE 1

[0122] In one example of a structure containing the joint connection of the present invention, an H-post fence brace structure contains the joint connection of the present invention. Referring to Figure 3B, it will be seen that the joint connection of the present invention may be used in, for example, assembling an H-post fence brace. As shown in Figure 3B, the various segments and members are not drawn to scale. The first post segment 300 and the second post segment 310 may be coupled together by member 320 to form an H-shaped construction. The member 320 is inserted into an opening 330 on the first post segment 300 and an opening 340 on the second post segment 310. In the example, the member 320 may pass through the openings 330 and 340 in the first post segment 300 and the second post segment 310 respectively. On the opposite side of the first post segment 300 to the opening 330 are tab-slots 350. Tabs 370 on the end of member 320 are inserted into the tab-slots 350. On the opposite side of the second post segment 310 opposite to the opening 340 are tab-slots 360. Tabs 380 on the end of member 320 are inserted into the tab-slots 360. After the tabs 370 and 380 on each end of the member 320 are aligned and inserted into the tab-slots 350 and 360, the tabs 370 and 380 are deformed by bending or crimping. Optionally, the connection between the member 320 and each post 300 and 310 may be welded, but welding is not necessary with the joint connection of the present invention. With the tabs 370 and 380 bent or crimped, the member 320 is coupled to both the post segments 300 and 310. For use as a fence brace assembly, as in the example, the bottom ends of the posts 300 and 310, with the member 320 connected, may be installed in the ground, typically in dirt, concrete or cement, and then leveled. Once set, each post may serve as an anchor or secure location to which barbed wire fencing, gates, chain link, animal security wire, razor wire and the like may be attached. For example, fence wire may be wound around either post at the end of a line of wire. The constructed fence brace assembly, including the joint connection of the present invention, may be, for example, repeated and spaced along the length of a fence to provide stability and bear the tension load of the length of fence. The constructed fence brace assembly, including the joint connection of the present invention, may be, for

example, be located at a corner in a fence to provide a secure anchor. The constructed fence brace assembly, including the joint connection of the present invention, may additionally serve as, for example, the support for a gate, swinging or otherwise, or alternatively as a doorway or room entrance not requiring a door such as those used, for example, for public restroom entrances.

[0123] Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein without departing from the invention as defined by the appended claims. Moreover, the scope of the present application is not intended to be limited to the particular embodiments of the process, machine, manufacture, composition of matter, means, methods and steps described in the specification. As one will readily appreciate from the disclosure, processes, machines, manufacture, compositions of matter, means, methods, or steps, presently existing or later to be developed that perform substantially the same function or achieve substantially the same result as the corresponding embodiments described herein may be utilized. Accordingly, the appended claims are intended to include within their scope such processes, machines, manufacture, compositions of matter, means, methods, or steps.